

U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-260 052

CONSERVATION OF WATER RESOURCES
THROUGH POLLUTION CONTROL

PUBLIC HEALTH SERVICE
WASHINGTON, D.C.

AUGUST 1954

254009

001977

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Bureau of State Services
Division of Sanitary Engineering Services

CONSERVATION OF WATER RESOURCES THROUGH POLLUTION CONTROL

PB 260 052

Washington, D.C.
August 1954

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

BIBLIOGRAPHIC DATA SHEET	1. Report No.	2.	3. Recipient's Accession No. PB-260 052
4. Title and Subtitle Conservation of Water Resources Through Pollution Control		5. Report Date Aug 54	6.
7. Author(s)		8. Performing Organization Rept. No.	
9. Performing Organization Name and Address Public Health Service, Washington, D. C. Div. of Sanitary Engineering Services.		10. Project/Task/Work Unit No.	11. Contract/Grant No.
12. Sponsoring Organization Name and Address		13. Type of Report & Period Covered	14.
15. Supplementary Notes Portions of this document are not fully legible.			
16. Abstracts The constancy of the U.S. water supply is noted in this analysis of the need for water conservation due to population growth and industrial expansion. Consideration is given to: water re-use cycle; cost of sewage treatment works; federal interest in water resources; evolution of water pollution control policies; technological developments impact; increases in pollution; waste treatment plant needs; elements of effective water pollution control programs; pollution control responsibility; Federal Water Pollution Control Act of 1948; research areas; consultative services; National Technical Task Committee on Industrial Wastes; watershed programs; interstate cooperation; state pollution control legislation; federal enforcement on interstate waters; financial assistance; and sewage treatment plant construction.			
17. Key Words and Document Analysis. 17a. Descriptors			
17b. Identifiers/Open-Ended Terms *Water conservation Watersheds Water resources State agencies *Water pollution control Regional planning Water supply Law(Jurisprudence) Sewage treatment Federal Water Pollution Control Act of 1948 Legislation 17c. COSATI Field/Group 13B			
18. Availability Statement		19. Security Class (This Report) UNCLASSIFIED	21. No. of Pages 54
		20. Security Class (This Page) UNCLASSIFIED	22. Price

ATTENTION

AS NOTED IN THE NTIS ANNOUNCEMENT,
PORTIONS OF THIS REPORT ARE NOT LEGIBLE.
HOWEVER, IT IS THE BEST REPRODUCTION
AVAILABLE FROM THE COPY SENT TO NTIS.

Chart 1

Conservation of Water Resources Through Pollution Control

Water pollution is an important phase of the broad problem of water conservation. It has an impact on health and well being, and affects all water uses.

Water is essential to life. Safe water is essential to health. An ample supply of safe water is essential to well being. In our modern life the two characteristics--safety and sufficient supply--can not be separated. Seventy million people, in 6,000 communities of the United States, depend on surface streams and lakes for drinking water. Hence, the adequacy of those sources, as to both quantity and quality, is of direct public health concern.

The conservation of water resources through pollution control is a partnership responsibility--Federal, State, and local. This presentation covers (1) the pollution problem itself; (2) the program of the Department of Health, Education, and Welfare under the Federal Water Pollution Control Act.

CONSERVATION OF OUR WATER RESOURCES THROUGH POLLUTION CONTROL

A PARTNERSHIP RESPONSIBILITY

- THE PROBLEM
- THE PROGRAM TODAY
- LEGISLATIVE PROPOSALS



PART I

THE PROBLEM

Chart 2

The Nation's Water Supply is Constant

Averaged over the years, the Nation's total water supply is constant. This stability is maintained through natural replenishment by rain and snow. For most areas of the country, the total supply is adequate, although it is not always present at the time and place it is needed, and is not always in a condition suitable for use.

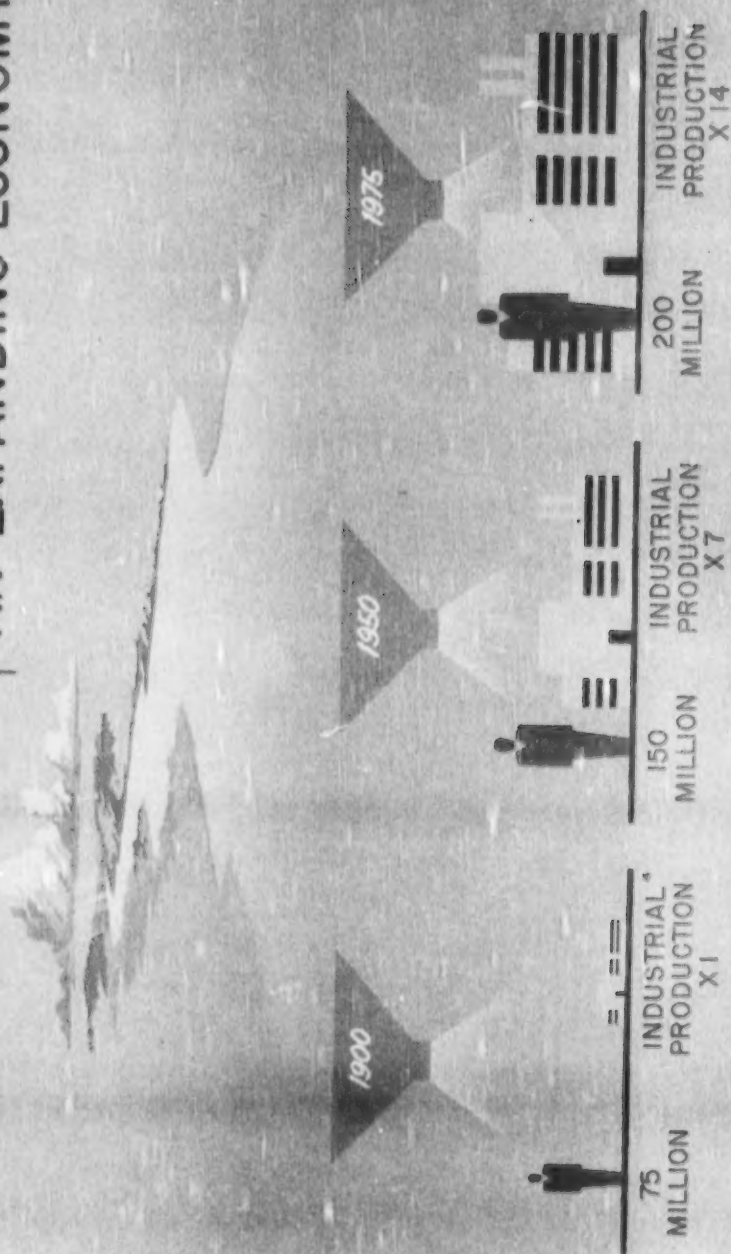
As population grows and industry expands, and as technological developments widen the field of water uses, the constant supply (by major watersheds) must meet ever increasing demands. In 1900 the United States had 75 million people (65 percent rural) and a relatively small industrial machine. By 1950, there were 150 million people (65 percent urban) and 7 times the indus-

trial productivity of 1900. Present estimates indicate that by 1975 there will be 200 million people and double the present industrial production. The population shift to urban areas is expected to continue. In general, the total amount of water will remain the same.

Maximum use of available water resources will be essential in order to meet the increased needs. Deficiencies can be offset in part by storage--impoundments of excess water for later release as needed--but in large measure the solution will be in the treatment of waste water after use by cities and industries so that streams can be used over and over as they flow from city to city and from State to State.

THE NATION'S WATER SUPPLY IS CONSTANT

-but must support | A GROWING POPULATION
AN EXPANDING ECONOMY



* INDEX

Chart 3

Water Re-Use Cycle

In primitive, sparsely populated areas, the water use cycle is simple--from stream to use and back again to stream. With the increase in population densities, man has added the element of water treatment before use, as a safeguard against impurities that inevitably are present in water that comes in contact with human activities. With that added element, the cycle is from stream, through purifying treatment, to use and back to the stream.

As concentration of population in cities increases, the volume of wastes returned to the streams with the used water becomes greater and greater, retarding natural stream purification processes and placing

great strain on water treatment facilities of downstream cities to produce safe and acceptable water for their uses. The more polluted the waters become, the more costly and complex the treatment for the various uses they must meet.

As a result of the difficulties caused by increasing pollution, another man-made element has been introduced into the water use cycle--treatment of used water to remove, to the degree necessary, the wastes added by such use. Thus the cycle becomes stream to purifying treatment, to use, then through another treatment process to remove wastes, and back to the stream.

WATER RE-USE CYCLE

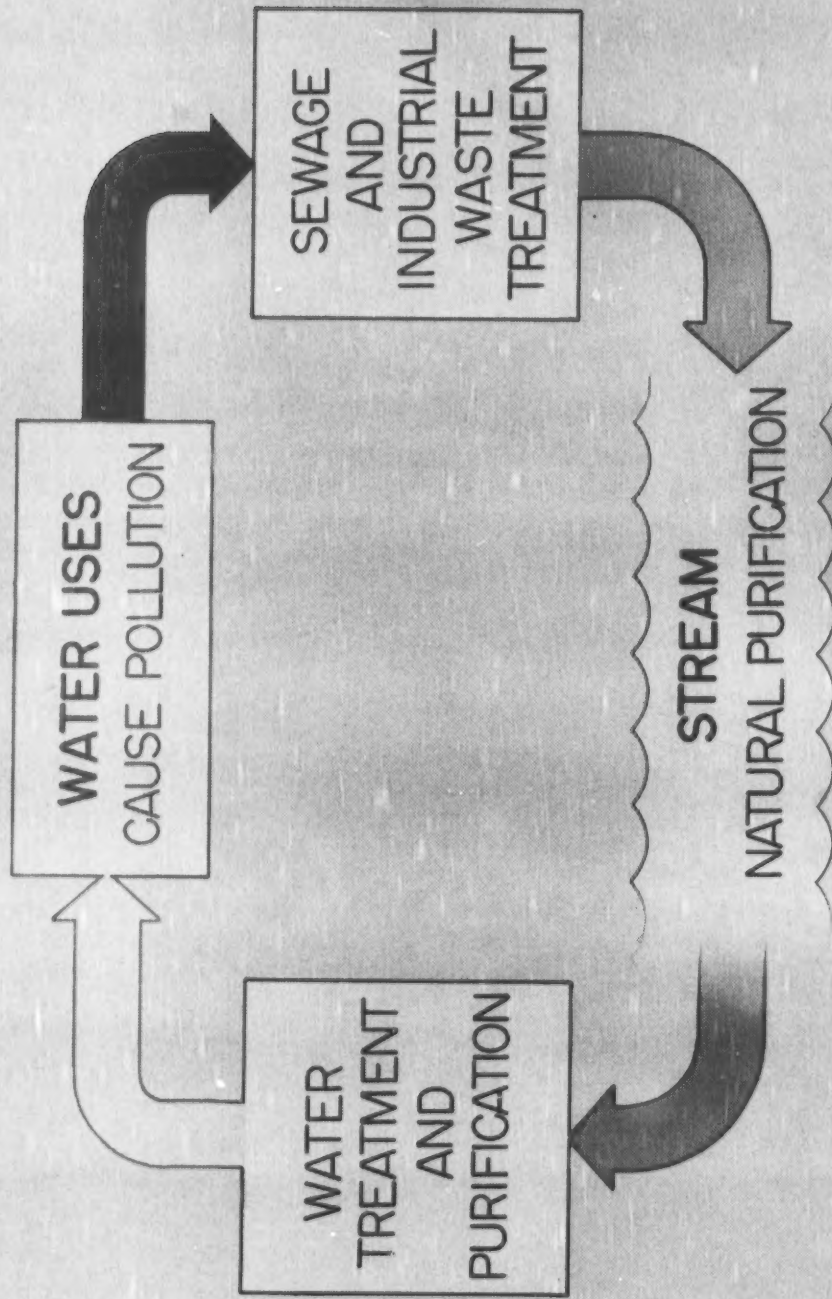


Chart 4

Cost of Sewage Treatment Works

Determination of the degree of sewage and industrial waste treatment to be provided is a complex and technical question. Treatment should be determined after full consideration of the uses for which water is required and of common or statutory law. It must also take into consideration stream flow, effects of water regulating structures, the ability of the stream to recover through natural purification processes and the like.

If it were possible to standardize treatment requirements at the highest level--complete treatment to remove all harmful wastes--these complications could be avoided. However, the economics of the situation precludes this simple solution. The higher the degree

of treatment, the more costly it becomes. For example, 40 percent reduction in the pollution effect of waste can be accomplished at about \$35 per capita; 75 percent reduction costs about \$70 per capita; 90 percent reduction costs about \$110 per capita. Thus the 15 percent additional treatment between 75 percent and 90 percent reduction costs \$40, more than the cost of removing the initial 40 percent.

In setting the standards of treatment, therefore, this factor of economics must be taken into consideration, in conjunction with the quality requirements of downstream water uses and the degree of pollution reduction provided through natural stream recovery.

COST OF SEWAGE TREATMENT WORKS



Chart 5

Federal Interest in Water Resources

Because of the basic importance of water to so many aspects of national life, functions concerning this resource are found in various agencies and at all levels of government. At the Federal level, for example:

The Department of Defense, through the Corps of Engineers of the Army, concerns itself with flood control and navigation.

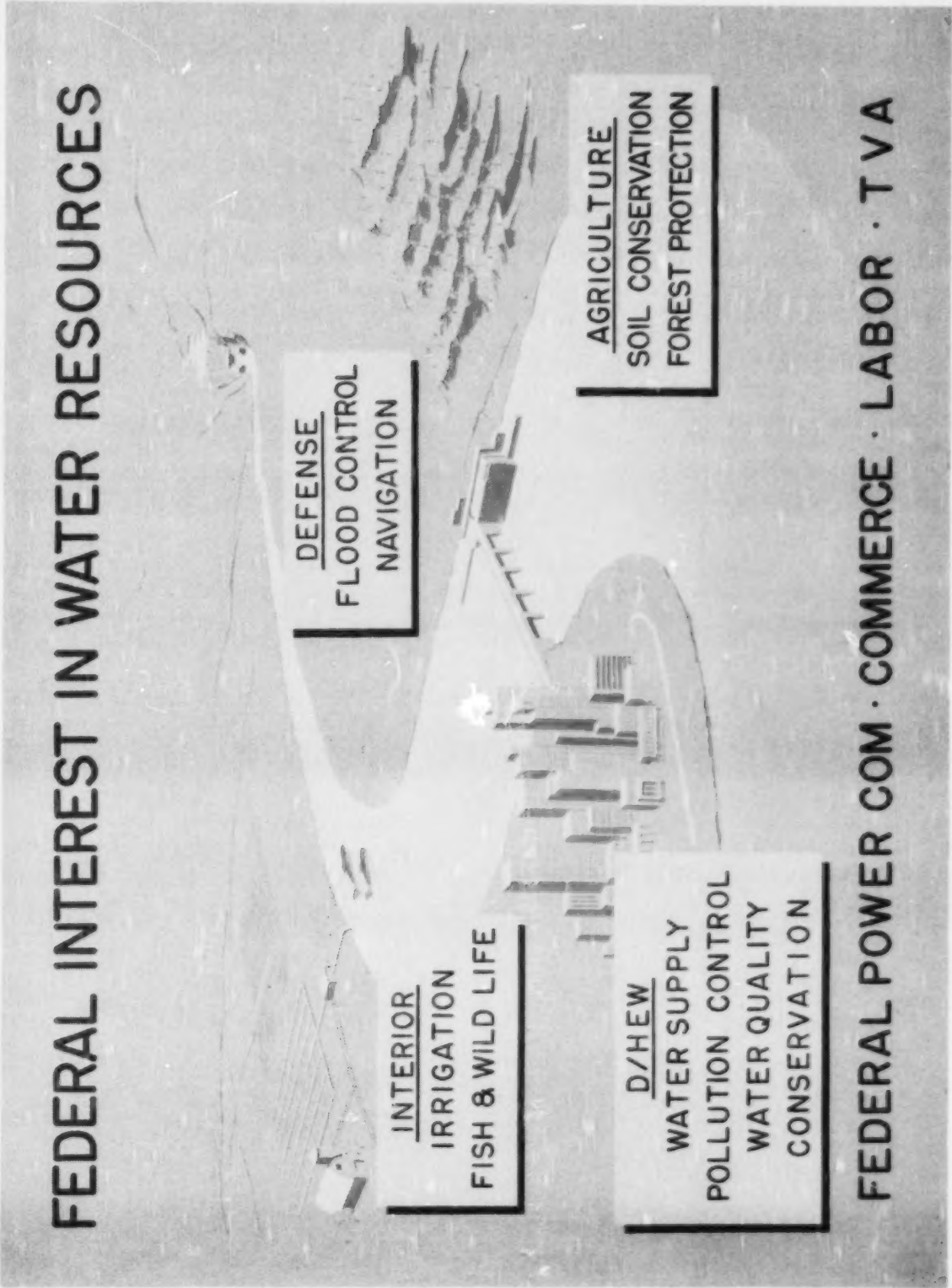
The Department of the Interior has responsibility for irrigation projects and for conservation of fish and aquatic life.

The Department of Agriculture is concerned with development of remedial measures for soil erosion and forest protection.

The interest of the Department of Health, Education, and Welfare is in the health aspects of water resources--water supplies, pollution control, water quality conservation. Where water projects create insect vector problems significant to health, the Department's interest includes these. Effective discharge of the Department's responsibilities concerning the health aspects of water resources helps in preserving water quality for all uses.

The Federal Power Commission and the Departments of Commerce and Labor have an interest in water resources as they relate to the respective fields of those agencies. The Tennessee Valley Authority administers an over-all program concerned with the water resources of that area.

FEDERAL INTEREST IN WATER RESOURCES



INTERIOR
IRRIGATION
FISH & WILD LIFE

DEFENSE
FLOOD CONTROL
NAVIGATION

D/HEW
WATER SUPPLY
POLLUTION CONTROL
WATER QUALITY
CONSERVATION

AGRICULTURE
SOIL CONSERVATION
FOREST PROTECTION

FEDERAL POWER COM · COMMERCE · LABOR · T V A

Evolution of Water Pollution Control Policies

The water pollution problem is largely a product of the 20th Century. Formulation of pollution control policies began around the turn of the Century, with the initial emergence of the problem. Since that time four Federal laws containing major provisions concerned with the control of water pollution have been enacted. Two of these, the Navigation (River and Harbor) Act of 1899 (Sec. 13), and the Oil Pollution Act of 1924, are primarily concerned with preventing damage to shipping and are administered by the Department of Defense. The Navigation Act prohibits the depositing of waste materials, other than that flowing from streets or sewers in a liquid state, in or on the banks of navigable waters and their tributaries. The Oil Pollution Act prohibits the discharge of oil into the coastal navigable waters of the United States.

The Public Health Service Act of 1912 gave specific authority to the Public Health Service to conduct investigations of the pollution of streams and lakes by sewage and other causes. And, finally, the Water Pollution Control Act of 1948, the first comprehensive-type legislation in this field, authorized expanded activity by the Public Health Service, adding the principles of cooperative program development, limited Federal enforcement, and financial aid.

Paralleling the legislative actions, other developments reflected evolving policies for pollution control. Scientific developments of the late 1800's provided the foundation for sanitary engineering practices adopted around 1900. Field investigations of the relationship of water pollution to typhoid fever epidemics were initiated by the Public Health Service about 1910. The Service's field station in Cincinnati was established under the expanded research authority of the 1912 Public Health Service Act. Research of that station and its successors, the Environmental Health Center and the Robert A. Taft Sanitary Engineering Center, contributed much to this Nation's leadership in techniques of water purification and sewage and waste treatment.

With the establishment of State health department structures, Public Health Service efforts were expanded in the early 30's to include demonstrations, training, and technical assistance to States.

The 1948 Water Pollution Control Act added the principles of basin-wide planning, consideration of all water uses in preparation of pollution control programs, and integration of water resource development programs as major elements in cooperative Federal-State-local water pollution control activities.

EVOLUTION OF WATER POLLUTION POLICIES

PROGRAM

FOUNDATIONS OF
SANITARY ENGINEERING

1870

RESEARCH

1900

RESEARCH • DEMONSTRATION •
TECHNICAL ASSISTANCE

EXPANDED PROGRAM
PLANNING
ENFORCEMENT
FINANCIAL AID

LEGISLATION

1899

NAVIGATION ACT

1912

PHS ACT
INCLUDING RESEARCH

1924

OIL POLLUTION ACT

1948

WATER POLLUTION
CONTROL ACT

Chart 7

Technological Developments Bring New Pollution Problems

Great technological advances are almost inevitably accompanied by some adverse consequences. It is the task of science to develop ways of eliminating undesirable stresses, where possible, and of moderating those which can not be entirely overcome.

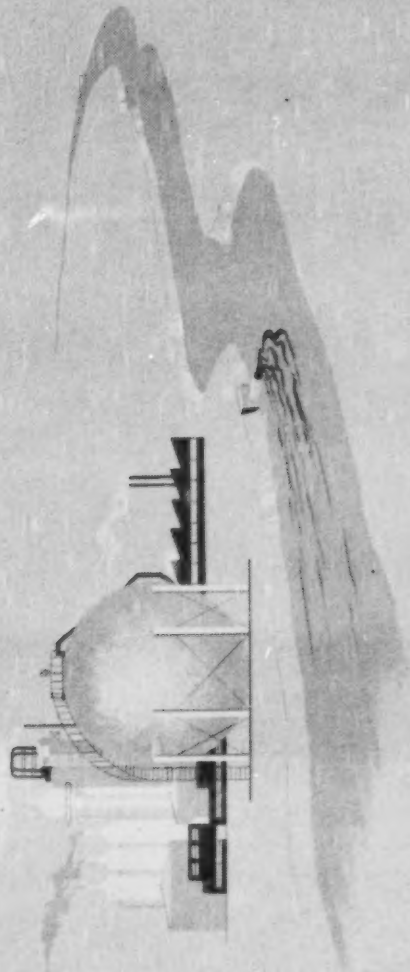
Advances since 1900, and particularly during the past 15 years of rapid development in the chemical field, have brought difficult and complex water pollution problems. In addition, changes have occurred so swiftly that there has been insufficient time to adjust and develop counter measures. Uncounted numbers of new synthetic chemicals have been developed. Many of these--detergents, synthetic fibers, insecticides, rodenticides, synthetic rubber, plastics--are being widely used in daily life. Science faces the challenge of discovering what effects the manufacture and use of these products are having on our streams and of devising means for

combating the effects which may be harmful.

For example, detergents--almost unknown before 1940--are now in common household and industrial use. Annual production has risen to a level of 1.5 billion pounds, and is expected to reach 4 billion pounds within the next 20 years. Already the effects of this heavy use of detergents are being felt in our sewage treatment plants and in water purification processes. Detergents are surface active agents, and their tendency is to lift and disperse foreign particles, whereas water and sewage treatment processes utilize the principle of settling and clumping such particles.

The emerging Atomic Age is presenting equally difficult water pollution problems. The buildup in radioactive wastes introduces an entirely new set of factors. Radioactive materials decay; thus time, dilution, and intermediate behavior, rather than biological action, are the important factors.

TECHNOLOGICAL DEVELOPMENTS BRING NEW POLLUTION PROBLEMS



- | | |
|--------------------|-------------------------|
| ● DETERGENTS | ● SYNTHETIC RUBBER |
| ● SYNTHETIC FIBERS | ● PLASTICS |
| ● INSECTICIDES | ● RADIOACTIVE MATERIALS |

Chart 8

Pollution Increasing Despite Progress

Since 1900 more than 9,000 waste treatment plants have been built, (6,600 municipal and 2,600 industrial). Despite these remedial measures, pollution of our waterways has increased. In 1900 there was a sewerage population of 30 million people. Industrial wastes added a pollution effect equivalent to another 10 million people.

By 1950 the sewerage population had increased to nearly 100 million, of which only one-third were served by adequate sewage treatment plants. The remaining two-thirds discharged raw sewage to the waterways or had inadequate sewage treatment plants. In 1950 organic industrial wastes entering the streams were equivalent to the wastes of a population of 110 million, almost twice the pollution load from

the 60 million urban population having inadequate or no sewage treatment. Of the measured industrial waste load, 20 per cent is discharged to municipal sewer systems and becomes a factor in the design of municipal treatment plants. The remainder is discharged through outlets separate from the municipal system.

Additional industrial wastes which can not be measured in terms of population equivalent also contribute to the total pollution load. Inorganic chemicals and wastes of undetermined type are discharged by nearly 5,000 industrial plants. Each day 10,000 tons of acid from mines drain into the waterways. Natural brines and silt add their polluting effects.

POLLUTION INCREASING DESPITE PROGRESS

OTHER INDUSTRY
ACID MINE DRAINAGE
INORGANIC WASTE

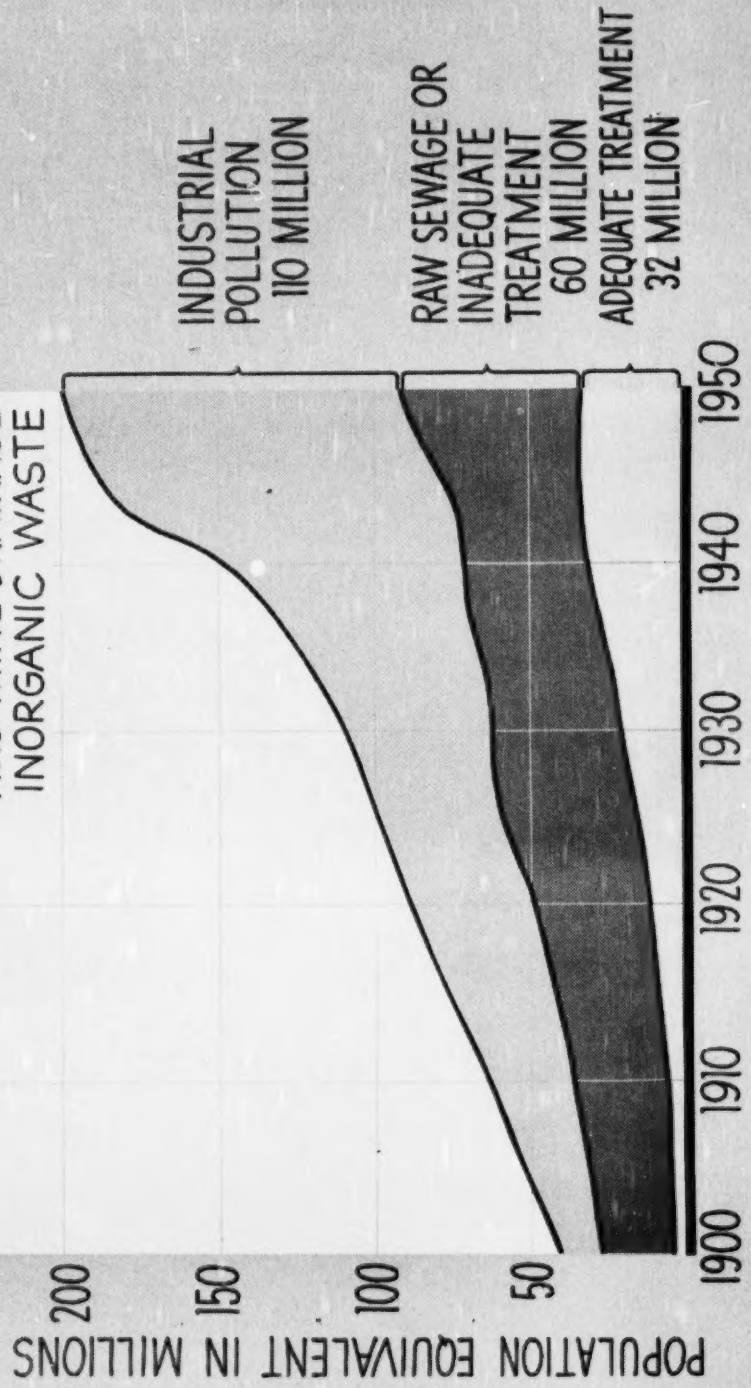


Chart 9

Waste Treatment Plant Needs

The geographical distribution of waste treatment plant needs, by major drainage basins, as might be expected, follows the general population distribution of the country. While the greatest volume of needs for both municipal and industrial plants is centered in the heavily populated and highly industrialized northeastern quarter of the country, the problem is a growing one in regions which are undergoing rapid development--California, the Pacific Northwest, the Southeast, and Texas. Large-scale water resource developments in the Missouri Basin will bring population and industrial growth which will create new problems there. The relatively smaller volume of needs in the Southwest part of the United States might appear to

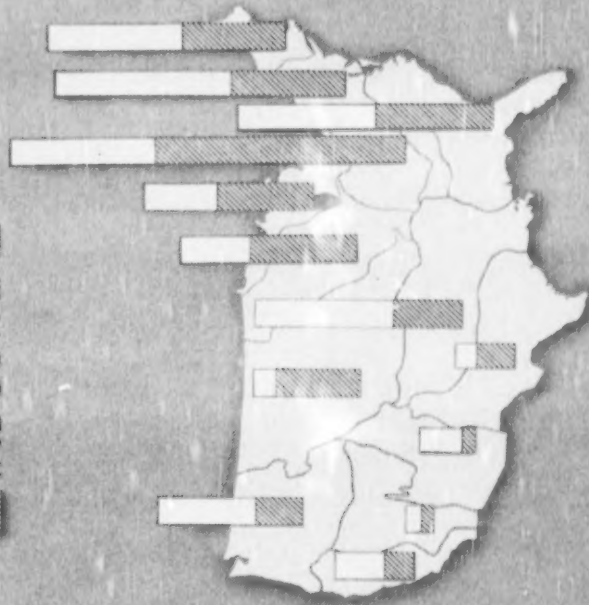
indicate a less critical pollution problem, but because of the scarcity of water in that region, the intensity of the problem is actually as great as in the well-watered East, South, and Northwest.

This country has approximately 12,000 sewer-ed communities and about 10,000 industries with individual waste outlets not connected to city sewers. All of these are potential sources of water pollution. Of the 12,000 cities, only 3,700 have adequate sewage treatment plants; 8,300 need new plants or major improvements to existing plants. Of the 10,000 industries, only 1,100 provide adequate treatment; 8,900 need new or improved abatement facilities.

WASTE TREATMENT PLANT NEEDS

BY RIVER BASIN

 MUNICIPAL
 INDUSTRIAL



NUMBER NEEDED

U.S. TOTAL

MUNICIPAL

12,000

NEW &
REPLACEMENT

8,300

ADEQUATE
CAPACITY

3,700

INDUSTRIAL

10,000

NEW &
REPLACEMENT

8,900

ADEQUATE
CAPACITY

1,100

Chart 10

Elements of Effective Water Pollution Control Programs

There are certain essential elements without which no pollution control program can be fully effective.

First, the program must be based on an understanding of the problem and sound technical knowledge. These are achieved through research.

An effective program requires: further technical field surveys to determine sources, characteristics, and extent of pollution; agreement on water uses and water quality standards; adequate legislation (including enforcement and financing provisions); channels and procedures for creating a public awareness of the problem; and coordination of pollution control plans with broad water resources development programs.

Finally, to be effective, the program must result in the construction of waste treatment works.

WATER POLLUTION CONTROL PROGRAMS

To be Effective

BASED ON RESEARCH

REQUIRE

TECHNICAL FIELD SURVEYS

AGREEMENT ON • WATER USES • WATER QUALITY

ADEQUATE LEGISLATION

PUBLIC INFORMATION

COORDINATION WITH WATER

RESOURCE DEVELOPMENT

RESULT IN
CONSTRUCTION
OF WASTE
TREATMENT WORKS

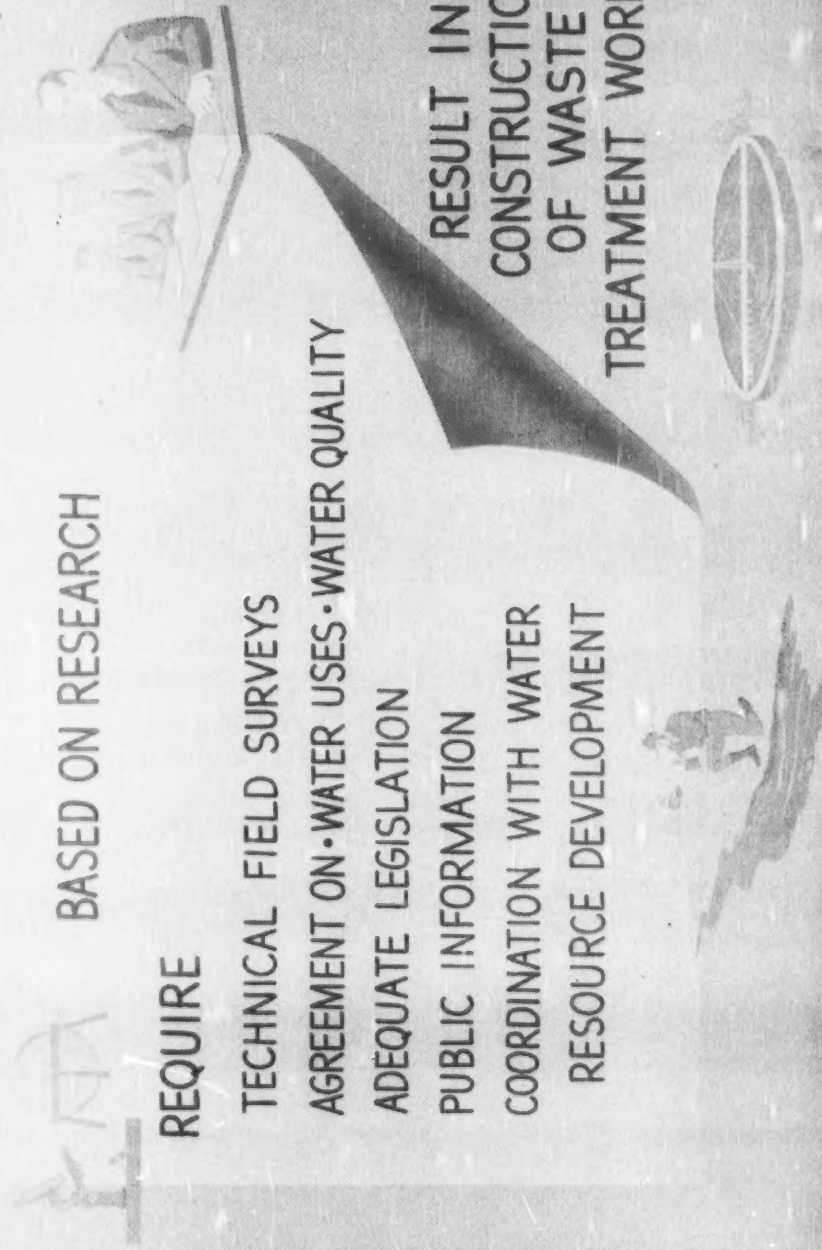


Chart 11

Water Pollution Control Responsibility Shared

The total job of water pollution control is a partnership responsibility shared by --

Cities and industries which construct, operate, and maintain pollution abatement works.

States which are primarily concerned with providing aid to local communities and industries in the design and operation of pollution abatement works, with carrying on water pollution investigations, and with administering the regulatory provisions of the State laws.

The Federal Government, which has responsibility primarily for research, for support to State programs, and for enforcement on interstate problems.

The Federal functions are outlined specifically in the Water Pollution Control Act of 1948.

WATER POLLUTION CONTROL RESPONSIBILITY

Shared by

CITIES AND INDUSTRIES	STATE	FEDERAL
CONSTRUCT	AID TO COMMUNITIES	RESEARCH STANDARDS
OPERATE	INVESTIGATION	ENFORCEMENT-INTERSTATE WATERS
MAINTAIN	ENFORCEMENT	SUPPORT STATES
<u>TO CONTROL POLLUTION</u>	<u>TO CARRY OUT</u>	<u>PUBLIC POLICY</u>

PART II

THE PROGRAM TODAY

Chart 12

Federal Water Pollution Control Act of 1948

The second part of this presentation relates to the water pollution control program of the Department of Health, Education, and Welfare, as carried on under the Federal Water Pollution Control Act of 1948.

The legislative history of the Act clearly indicates that this was experimental, compromise legislation designed to provide a basis for ultimate determination of the Federal role in the water pollution control field. The Senate report on the measure which was finally adopted stated that if the desired results were not achieved under the cooperative plan it provided, some future Congress would undoubtedly consider more stringent Federal controls. The Act provided for:

Research and field studies, with emphasis on the industrial waste problem;
Consultative services to State and interstate agencies;
Development, by watersheds, of compre-

hensive programs of corrective measures, these programs to be prepared cooperatively with the States, interstate agencies, municipalities, industries, and others.

Promotion of interstate cooperation, including interstate compacts and uniform State legislation;

Enforcement on interstate pollution problems; and

The principle of Federal financial assistance to cities for construction of pollution abatement works.

The Act also provided for a Presidentially-appointed Advisory Board, and included authority for construction of a sanitary engineering research center at Cincinnati.

The Department's program activities under each of the above elements of the Act are presented, in order, in the following pages.

WATER POLLUTION CONTROL ACT - 1948

Provides for

- RESEARCH
- CONSULTATIVE SERVICES
- DEVELOPMENT OF WATERSHED PROGRAMS
- INTERSTATE COOPERATION
- ENFORCEMENT
- FINANCIAL ASSISTANCE



Chart 13

Organization and Resources - 1948 Act

Administration of the Water Pollution Control Act was placed organizationally in the Division of Sanitary Engineering Services, Bureau of State Services, Public Health Service. Functions relating to policy formulation, program coordination, and inter-agency relations are retained in the headquarters office in Washington. The Robert A. Taft Sanitary Engineering Center carries out the responsibilities concerned with research, training, and technical consultation to States and interstate agencies. Field operations are carried on as part of the regional programs, through the Department's regional offices.

Annual appropriations have averaged about \$1 million. The average number of professional personnel has been 120, with total personnel numbering about 200.

ORGANIZATION AND RESOURCES - 1948 ACT

DIVISION OF SANITARY ENGINEERING SERVICES - BSS

HEADQUARTERS

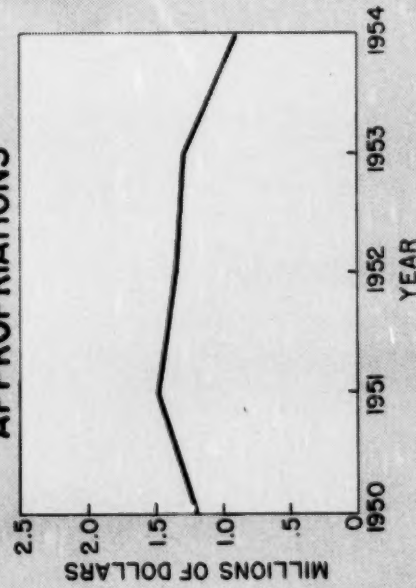
POLICY FORMULATION
PROGRAM COORDINATION
INTERAGENCY RELATIONS

TAFT S.E.C.

RESEARCH
TRAINING
CONSULTATION

REGIONAL OFFICE PROGRAM OPERATION

APPROPRIATIONS



PERSONNEL

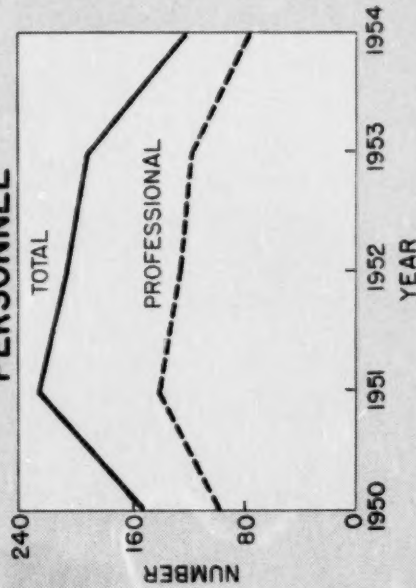


Chart 14

Research Areas are Broadening

Research on health-related aspects of pollution has failed to keep up with the new problems created by progressing technology, rapidity of new developments, and changing water patterns. Another recently recognized hazard not attributable to these developments is the possible role of water supply in the transmission of certain virus diseases. Research now under way includes such areas as --

The dangers of increased pollution to public health. In addition to the increases in bacterial and virus pollution, the broad, relatively unknown effects of increased chemical pollution require study; knowledge is needed on the ability of present water treatment processes to cope with increased volumes and new types of pollution.

A re-definition of the natural purification phenomena of streams is necessary in the light of the new composition of wastes, including chemical loadings.

Especially important is the development of more economical waste treatment methods. Successful pursuit of promising leads in this area will save millions of dollars of construction costs.

Research is needed to provide the basis for adjusting laboratory techniques, both in measuring pollution levels in streams and for determining efficiency of water treatment. Examples are adaptation of the infra-red absorption technique for identifying chemical pollution and perfection of the membrane filter in the field of sanitary bacteriology. There is promise in adaptation of biological indices to replace the B.O.D. standard as a measure of long-range pollution.

The effect of impoundments on pollution behavior in streams is another area of importance.

Countless new problems related to pollution of streams by radioactive materials are demanding investigation.

RESEARCH - Areas Broadening

Due To

ADVANCING TECHNOLOGY

RAPIDITY
OF NEW DEVELOPMENTS

Examples

CHLORINE CHEMISTRY

BIO-ASSAY TECHNIQUE

RADIOACTIVE WASTE

MEMBRANE FILTER

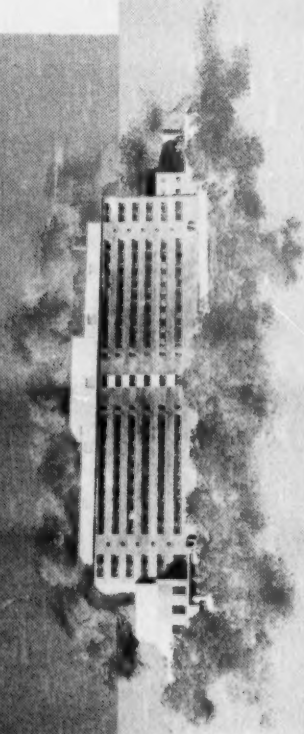


Chart 15

Consultative Services

Consultative services are provided to State and interstate agencies on their water pollution control problems, and through the States, to municipalities and industries. The assistance given is based on the knowledge and experience gained through the Public Health Service's research, training, and demonstration programs.

Consultative services include assistance in the field of planning and carrying out basin-wide pollution abatement programs; in the solution of difficult individual pollution problems requiring resources or high-level technical competence in a specialized field not normally available to State health departments; in State programs for the training of local pollution abatement personnel; and in developing improved inter-industry cooperation.

RESEARCH

TRAINING

DEMONSTRATION

CONSULTATIVE SERVICES

To

STATES

INTERSTATE AGENCIES

MUNICIPALITIES

INDUSTRIES

Examples

STATE PROGRAM DEVELOPMENT

MUNICIPAL WATER SOURCES

Chart 16

National Committee on Industrial Wastes

Through the National Technical Task Committee on Industrial Wastes, a great deal has been accomplished in the promotion of industry-government and inter-industry cooperation on pollution problems resulting from industrial wastes. The Committee was established in 1950 with the primary objective of strengthening industry-government relations in this field. The group represents 36 major industrial categories, covering 10,000 individual plants. Four major task groups -- Food, Mineral Products, Chemical Processing, and General Industries -- operate within the committee organization to carry on its activities.

The value to be derived from the coordinated research and pooling of information available to a group having this wide representation

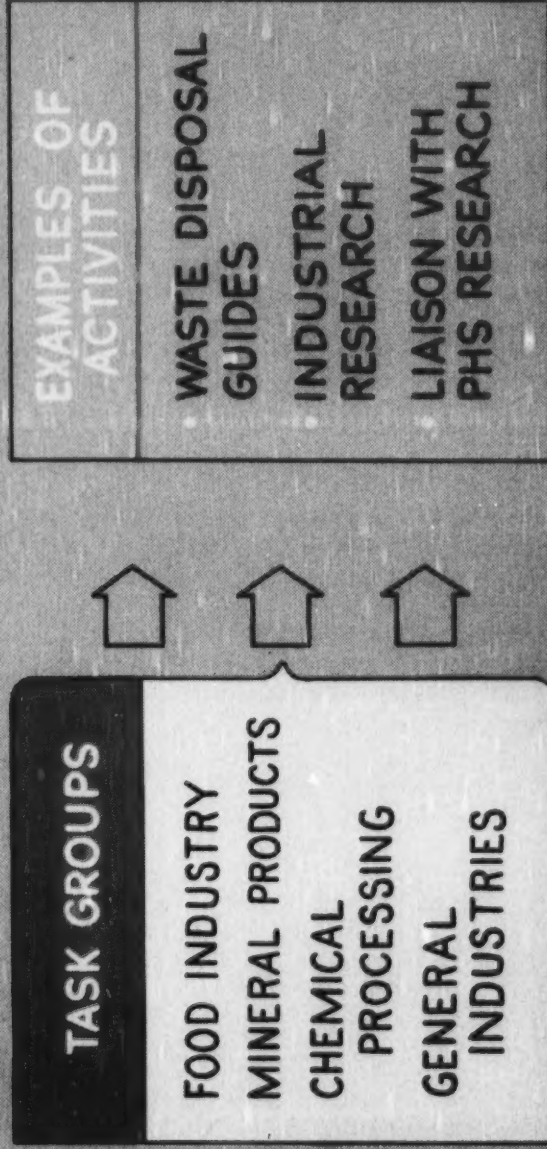
over the entire industrial field is obvious. Further, the Committee's suggestions as to broad areas of needed research have been very helpful to the Public Health Service in planning its research program.

The Committee's activities have promoted -- the development of industrial waste guides for the assistance of plant operators in various categories of industry; coordinated research by industry; formation of inter-industry committees for the exchange of technical information; establishment of a national bibliographical service on industrial waste treatment problems and methods; and a strong liaison with the Robert A. Taft Sanitary Engineering Center.

The Public Health Service provides the Secretariat for the Committee.

NATIONAL COMMITTEE ON INDUSTRIAL WASTES

Strengthens Government-Industry Relations



Development of Watershed Programs

Priority consideration has been given to the important provision of the Act relating to the development of comprehensive watershed pollution abatement programs. The principle of basin-wide planning has been firmly established with respect to over-all water resource development programs. Its value in the development of water pollution control programs is self-evident.

Development of these blueprints for pollution control is based on the compilation of data on pollution sources, including quantities and characteristics; agreement on desired water uses; establishment of water quality standards; and finally, determination of treatment requirements to preserve the desired uses. This is a cooperative program with the States, and to have meaning must represent the views and desires of the States.

Compilation of the base data on pollution sources, quantities, and characteristics has been completed for the entire country. The findings have been published in 15 major basin reports, with distribution to the cities and industries concerned. Since these data, to be of value, must be kept current, a continuous inventory is maintained through a field-reporting machine-records operation. The data have value beyond the water pollution control program itself. For example, they provide the foundation for information on sewerage facilities

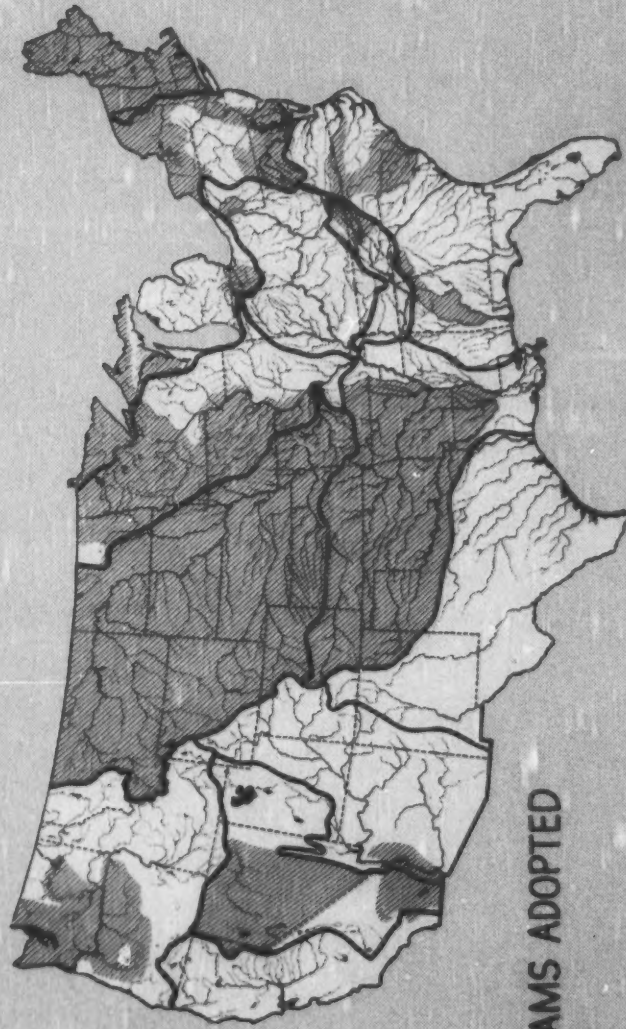
which the Public Health Service is periodically called upon to supply to the Office of Defense Mobilization and to the President's Council of Economic Advisors, for use in connection with their over-all national planning activities.

The second and more difficult phase of watershed program development--that of reaching agreement on stream uses and water quality standards--is now well under way. For the shaded areas on the map, this phase has either been completed or is in final stages. Comprehensive programs for all of those areas will have been adopted by the Surgeon General by the end of the current fiscal year. Others are in various intermediate stages of preparation.

While adoption of a comprehensive plan will not, in itself, reduce pollution, it does represent agreement within and between the affected States on the factors on which action must be based--water uses, standards of water quality, and degree and type of treatment. It provides specific blueprints for the States to follow in proceeding with their promotion and regulatory actions.

The development work on the watershed programs has been the backbone of the Federal pollution control activities, providing an important means for stimulating interstate cooperation and close working relationships.

DEVELOPMENT OF WATERSHED PROGRAMS



PROGRAMS ADOPTED

SOURCE DATA

LOCATION

VOLUME - TYPE

KNOWN EFFECTS

BASIN PROGRAMS

WATER USES

STANDARDS

TREATMENT

Interstate Cooperation Through Pollution Control Compacts

As one means of promoting interstate cooperation in pollution control, the Water Pollution Control Act suggested formation of interstate compacts. The five interstate commissions now actively carrying on such activities under compact agreements include:

1. The Ohio River Valley Water Sanitation Commission -- Compact approved by the Congress in 1948. Commission has been granted regulatory authority by the member States.
Member States: Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, Virginia, West Virginia.
2. Interstate Commission on the Potomac River Basin -- Compact approved by the Congress in 1940. Advisory and promotional functions; no regulatory authority.
Member States: District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia.
3. Interstate Commission on the Delaware River Basin (Incodel) -- Set up as an informal committee in 1936, by resolution of a committee of the Conference of State Commissions on Interstate Cooperation; later ratified by the legislatures of the respective States; no formal approval by Congress.

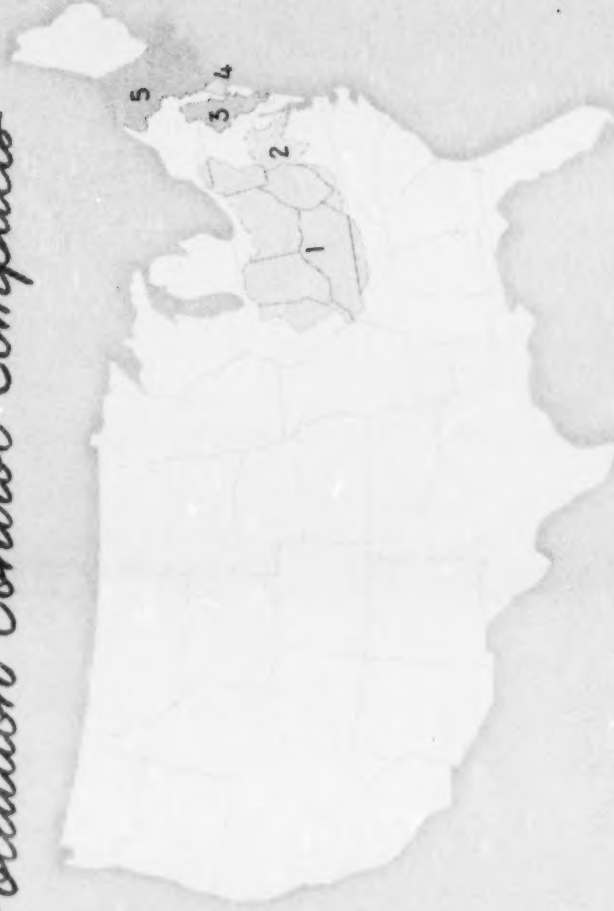
Member States: Delaware, New Jersey, New York, Pennsylvania.

4. Interstate Sanitation Commission (New York Metropolitan Area) -- Compact approved by Congress in 1935. Commission is authorized to classify certain designated interstate waters, recommend uniform legislation, and order the adoption of treatment methods to achieve certain standards of water purity.
Member States: New York, New Jersey, Connecticut.
5. New England Interstate Water Pollution Control Commission -- Compact approved by Congress in 1947. Advisory and promotional, no regulatory authority.
Member States: Connecticut, Massachusetts, New Hampshire, New York, Rhode Island, Vermont. (Provision is made for the addition of Maine as a signatory to the agreement, but this action has not yet been taken.)

Negotiations for the establishment of compact organizations considering pollution control are under way among the States of the Columbia River Basin, the Tennessee River Basin, and the Missouri River Basin.

INTERSTATE COOPERATION

Thru Pollution Control Compacts



☐ 1 OHIO RIVER

☐ 2 POTOMAC RIVER

☐ 3 DELAWARE RIVER

☐ 4 NEW YORK AREA

☐ 5 NEW ENGLAND

Interstate Cooperation Through Regional Councils

The formation of interstate water pollution control compacts is a time-consuming process requiring negotiation between the States, drafting and redrafting of tentative agreements, submission to and consideration by the legislatures of the respective States, and finally, submission to the Congress for formal approval. The Ohio Compact, for example, initiated in the early 1930's, was not approved by the last of the 8 participating States and by the Congress until 1948.

Clear demonstration of the particular advantages of interstate action in the pollution control field is required in order to outweigh the deeprooted opposition of many of the States to any delegation of their prerogatives and responsibilities. To provide such a demonstration, a system of regional councils has been developed as an intermediate step toward encouraging closer interstate working relationships and, where desirable, interstate compacts.

The regional councils are organized by watersheds, or by broad geographical areas. They are composed of the chief engineers of the water pollution control agencies of the several States. They meet periodically to work on basin problems of common interest, such as water quality standards, water uses on interstate streams, water supply development, and the like.

Seven such regional groups are now in operation. With the five compact organizations in the eastern part of the country, they now provide the mechanism for coordinated interstate action on pollution control for practically the entire Nation.

The intangible value of the councils is often equal to or even greater than the tangible benefits, in that the council provides a mechanism for exchanging views, comparing techniques, and promoting generally a better understanding between the States.

INTERSTATE COOPERATION *Thru Regional Councils*



1 PACIFIC NORTHWEST

2 COLORADO

3 MISSOURI

4 RED RIVER (N)

5 UPPER MISSISSIPPI

6 GREAT LAKES

7 SOUTHERN

Chart 20

State Pollution Control Legislation

State lines form no barrier to flowing streams nor to the pollution they carry. Because so many of the Nation's streams are interstate in character, the lack of effective regulatory measures for pollution control in one State can seriously affect the abatement programs of adjoining States. It is essential that there be some uniformity, or at least consistency, in the principles of the laws under which the States within each major watershed carry on their pollution control programs.

In recognition of the need for more common denominators in State water pollution control laws, the Congress directed, in the 1948 Water Pollution Control Act, that adoption of uniform State laws in this field be encouraged. An initial step in carrying out this directive was the development of a suggested State law by the Public Health Service, in cooperation with the Council of State Governments and the advice of more than 700 individuals and a special consulting body of State and industrial officials. The

final document carried the approval of the key professional groups in the field and was endorsed by the Council of State Governments.

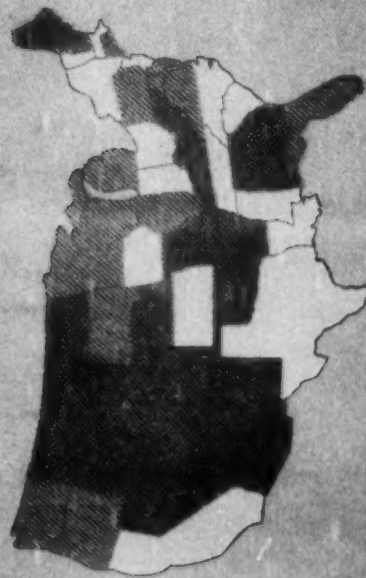
The suggested law was not a wholly new draft, but rather a composite of the best provisions of existing laws, as indicated by the past experience of the States.

Since 1948, the principles of the suggested act have been used either in new legislation or in modifications of existing statutes adopted by 28 States in the interest of more practical and effective measures, and, incidentally, of providing more uniformity in the State's approach.

In 1948, only 14 States had water pollution control laws considered reasonably comprehensive; 16 States provided limited pollution control authority; and 18 had the very minimum or none at all. At present, 29 States have satisfactory legislation; 9 have limited authority; and 10 have minimum provisions.

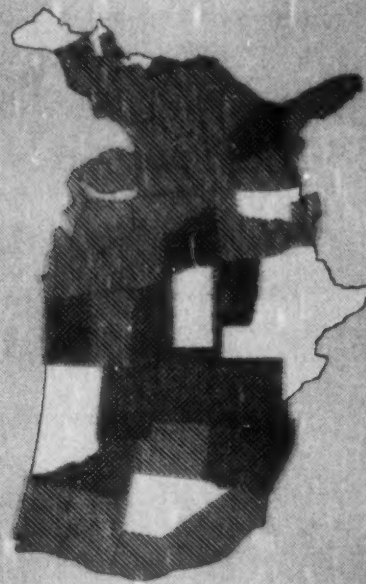
STATE POLLUTION CONTROL LEGISLATION

Status - 1948



■ MINIMUM LEGISLATION
□ LIMITED
■ COMPREHENSIVE

Progress - 1948-54



28 STATES HAVE AMENDED OR
PASSED NEW LEGISLATION
SINCE 1948

Federal Enforcement - Interstate Waters

The Act provides limited authority for Federal enforcement action on interstate pollution problems. The enforcement procedure requires, first, that a public nuisance be declared--a finding that pollution originating in one State is affecting the health or welfare of people in another State. Considerable work in the assembling of technical data on which to base such a finding is, of course, required before the declaration that a public nuisance exists can be made. The Surgeon General is then authorized to issue a notice to the offending parties. If no action is taken after a reasonable time, a second notice is issued, and then if no action is taken the Secretary of the Department of Health, Education, and Welfare is authorized to call a public hearing before a board. This hearing is to be held in the area in which the pollution is occurring. If no action is taken on the recommendations of the board, the Secretary may then request the Attorney General to bring suit on behalf of the United States to

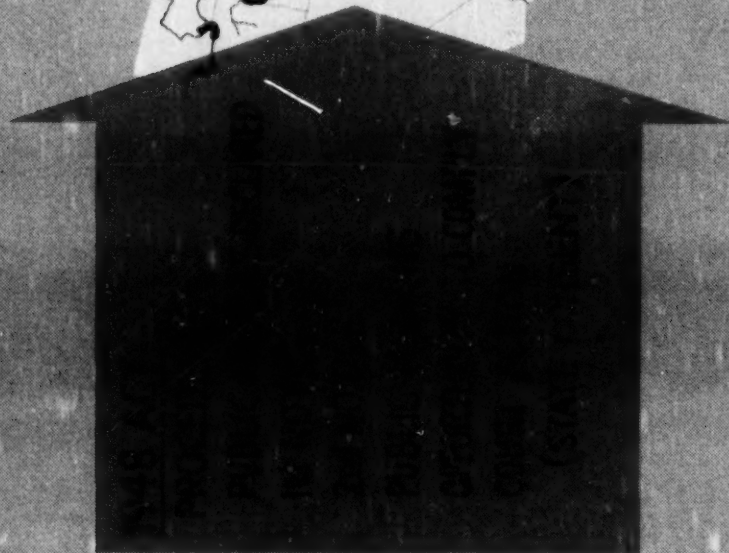
secure remedial action. Requisite to this latter step is the consent of the State in which the pollution originates. To carry through the several steps outlined requires from two to four years.

More than 100 situations involving interstate pollution have been identified. Detailed reports have been prepared on about 60 of these problem areas, and have been sent to the appropriate State water pollution control agencies with the request that special attention be given to finding solutions. In several cases it has been possible for the Public Health Service, acting as an intermediary, to reconcile differences and assist the States concerned in arriving at satisfactory solutions.

In accordance with congressional policy, as reflected in the Act, the States are being given every opportunity to correct these interstate situations before Federal enforcement authority is invoked.

FEDERAL ENFORCEMENT

Interstate Waters



PROBLEM AREAS

Chart 22

Financial Assistance

The Water Pollution Control Act included several financial assistance provisions. One of these authorized \$1 million annually for grants to the States and interstate agencies for studies and investigations on pollution problems caused by industrial wastes. Appropriations were made under this authorization for fiscal years 1950, 1951, and 1952. The funds were apportioned to the States and interstate agencies on a combined formula and project grant basis. They were spent for field studies (70 percent), laboratory facilities (15 percent), and research (15 percent).

One intent of these grants was to stimulate State pollution control programs. The degree of success in this experiment is indicated by the fact that State appropriations for water pollution control activities increased from a ratio of \$2.2 to every dollar of Federal grant money in 1950, to \$2.9 in 1951, and to \$4 in 1952. The grant funds were deleted from the 1953 HEW appropria-

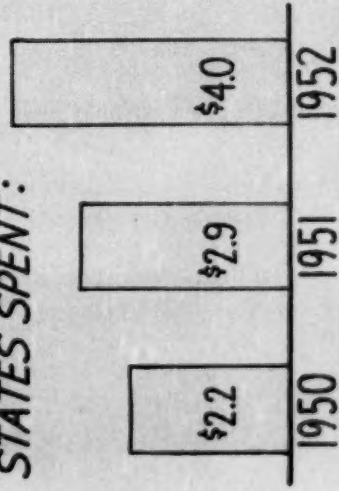
tion bill on the floor of the House--a Korean casualty. They have not been included in the budgets submitted for succeeding years. Since 1952, State appropriations for pollution control have remained about constant.

The two other financial assistance provisions of the Act authorize \$1 million annually for grants to municipalities for planning needed abatement works, and \$22.5 million annually for loans at 2 percent interest to municipalities to aid in the construction of these facilities. Planning grants were limited to the lesser of either \$20,000 or one-third of the estimated cost. Construction loans were limited to the lesser of either \$250,000 or one-third of the estimated cost of the project. Neither of these authorizations has ever been implemented by appropriations. It has, therefore, not been possible to test the effectiveness of such assistance in stimulating construction of sewage treatment facilities.

FINANCIAL ASSISTANCE

GRANTS TO STATES
\$1 million per year

For
EACH GRANT DOLLAR
STATES SPENT:



GRANTS FOR
PROJECT PLANS
\$1 million per year



CONSTRUCTION
LOANS
\$22.5 million per year

Sewage Treatment Plant Construction

Abatement of pollution from cities is achieved through the construction of sewage treatment works. The accompanying chart shows actual construction in this field over the years, as measured by the volume of expenditures (in 1950 dollars), and compares this accomplishment with the volume of construction required over a 10-year period to bring municipal pollution under satisfactory control.

The history of construction from 1915 to the present time reveals that the average annual rate of construction has been \$140 million. It is interesting to note that construction of pollution abatement works reacts to economic situations -- the dip in construction during World War I, the post-war build-up, the dip following the early years of the depression, the huge build-up due to the public works program, reflected in the late 30's, the practically total suspension of construction during World War II, the post-war build-up, another drop reflecting the Korean situation, and now a slight recovery.

It must be borne in mind that during the World War II period of sharply increased industrial production and major population shifts, creating new and expanded pollution problems,

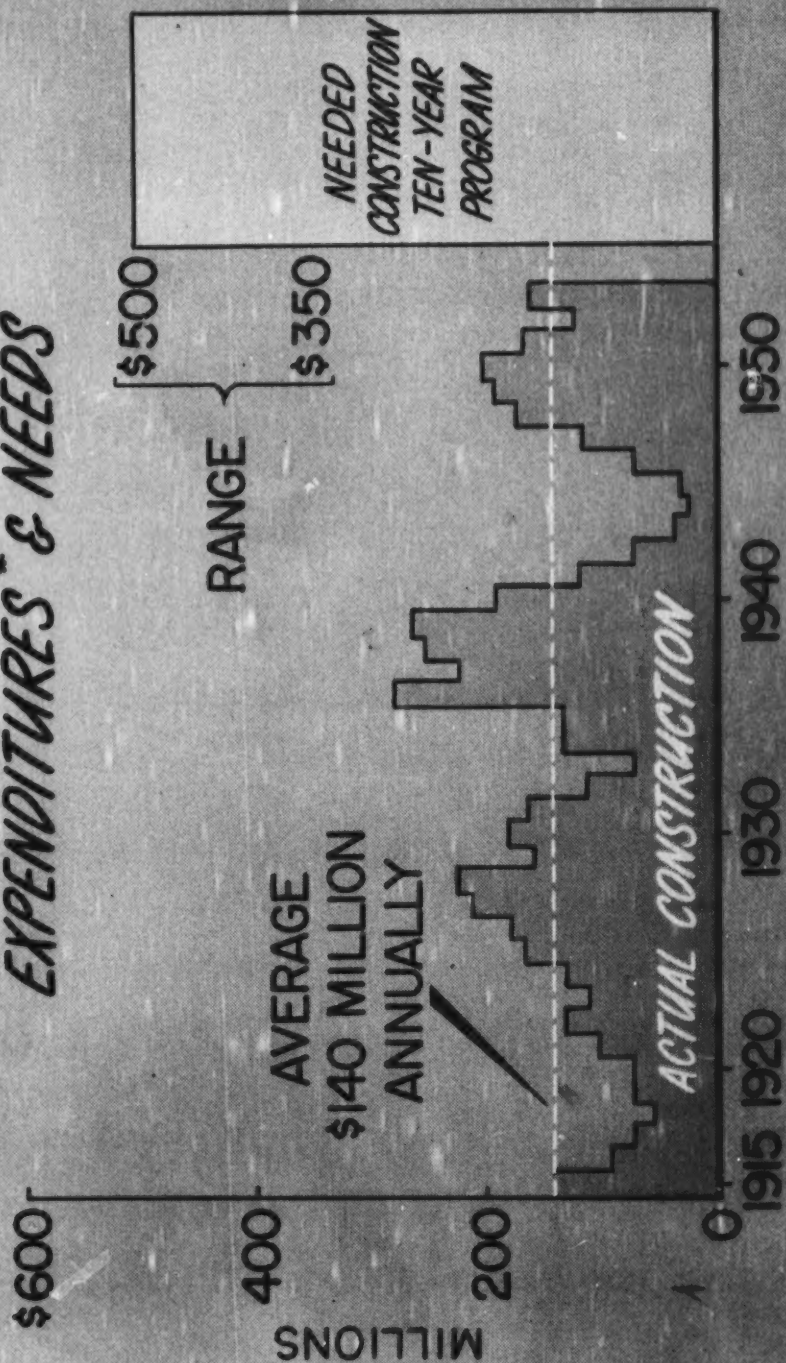
sewage treatment plant construction was limited by the materials and labor situation to emergency, war-related projects. At this time, too, the staffs of State pollution control agencies were depleted and all available resources were diverted to the war effort.

With the resources provided under the 1948 Water Pollution Control Act, it has been possible to aid the States through the period of re-staffing, training, and over-all program development. The fact that half the States still provide less than \$30,000 a year for pollution control activities is evidence that many of them are not yet geared to undertake the full burden of this work. The recognition given the problem by the Federal Government, in the provisions of the Act, has been of real value.

To meet current needs and gradually eliminate backlogs will require, over the next 10 years, a construction rate at a level of between \$350 million and \$500 million a year. The rate of expenditure can be adjusted by lengthening the time period or by reducing water quality standards. On the basis of present knowledge regarding water resources and needs, it would appear that the Nation can ill afford either of these alternatives.

SEWAGE TREATMENT PLANT CONSTRUCTION

EXPENDITURES* & NEEDS



* BASED ON 1950 DOLLARS

Public Policy on Pollution Control

The major post-war effort--both Federal and State--has been directed toward producing the foundation material requisite to an intelligent construction program. The point has now been reached that efforts can be marshalled for a sustained drive to raise construction levels to meet the needs.

The type and extent of the Federal Government's role in this drive are questions of major importance at this time. Under our form of government, and on the basis of experience, there appears to be no question that the primary right and responsibility for control of pollution should remain in the States. Certain responsibilities of the Federal Government also seem clear -- those relating to research, support, coordination, and control over interstate pollution. Considerations which support this conclusion include:

1. The broad public interest involved. Pollution damage affects the Nation's health, its economy, and all facets of national life.
2. The seriousness and growth of the problem. Sufficiently rapid progress to overcome the tremendous backlogs that are being built up is beyond the resources of many of the States.

3. The interstate character of waterways. Individual States have no control over pollution arising in another State.
4. The need for basin-wide coordination. River basins extend beyond State boundaries. Effective pollution control can be achieved only through treating the entire basin as a unit in planning corrective measures.
5. Federal jurisdiction over the Nation's waterways.
6. Protection of Federal resource investment. Millions of dollars have been spent by the Federal Government in water resource development. The national interest requires that this investment be protected against pollution damage.
7. The need to alleviate inequities. For example, within competitive industries, plants discharging wastes under comparable water situations should be required to practice similar abatement measures. Otherwise, water pollution abatement will become an economic barrier in plant location. Obviously, there will always be variations in treatment where stream conditions are not comparable.

PUBLIC POLICY ON POLLUTION CONTROL



STATE ROLE

PRIMARY RESPONSIBILITY FOR CONTROL

FEDERAL ROLE

RESEARCH-SUPPORT-COORDINATION
CONTROL OVER INTERSTATE POLLUTION

BASIS FOR FEDERAL ROLE

- BROAD PUBLIC INTEREST INVOLVED
- SERIOUSNESS AND GROWTH OF PROBLEM
- INTERSTATE CHARACTER OF WATERWAYS
- NEED FOR BASIN-WIDE COORDINATION
- FEDERAL JURISDICTION OVER NATION'S WATERWAYS
- PROTECTION OF FEDERAL RESOURCE INVESTMENT
- ALLEVIATE INEQUITIES